COMMERCIAL OPERATING INSTRUCTION MANUAL

N.S.N.: 4110-01-117-3902

REFRIGERATOR, MECHANICAL
BLOOD BANK

110/220 VOLT
50/60 HZ. A. C.

THE JEWETT REFRIGERATOR CO.
2 LETCHWORTH STREET
BUFFALO, NEW YORK 14213-1098

CONTRACT NO. DLA120-87-C-8528

MODEL NO. BBR37SS-IB-03

1987

PRF 117

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OPERATING INSTRUCTION MANUAL

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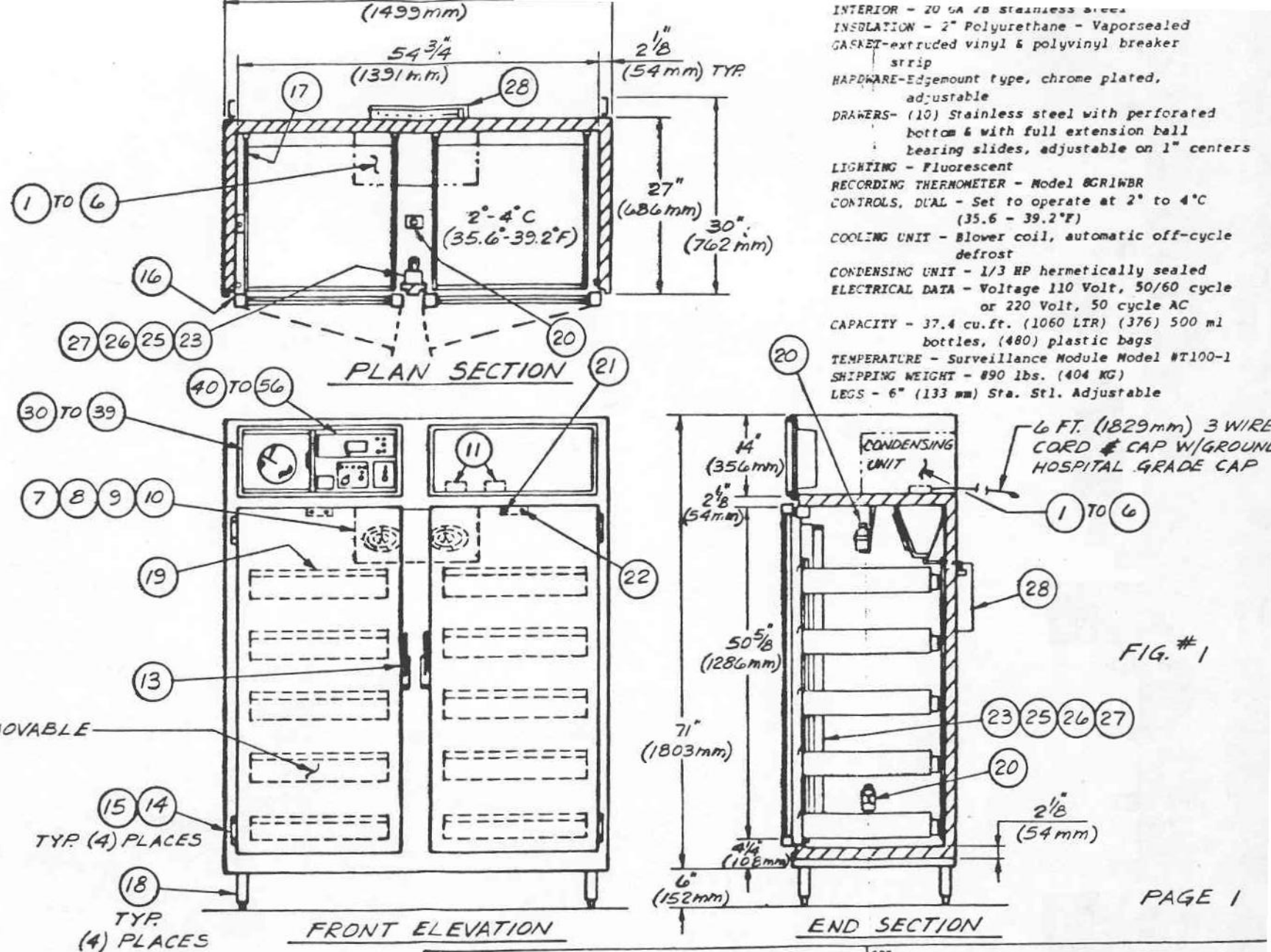


INTERIOR - 20 GA 2B Stainless Steel
INSULATION - 2" Polyurethane - Vaporsealed
GASKET-extruded vinyl & polyvinyl breaker strip
HARDWARE-Edgemount type, chrome plated, adjustable
DRAWERS- (10) Stainless steel with perforated bottom & with full extension ball bearing slides, adjustable on 1" centers
LIGHTING - Fluorescent
RECORDING THERMOMETER - Model 8GR1WBR
CONTROLS, DUAL - Set to operate at 2° to 4°C (35.6 - 39.2°F)
COOLING UNIT - Blower coil, automatic off-cycle defrost
CONDENSING UNIT - 1/3 HP hermetically sealed
ELECTRICAL DATA - Voltage 110 Volt, 50/60 cycle or 220 Volt, 50 cycle AC
CAPACITY - 37.4 cu.ft. (1060 LTR) (376) 500 ml bottles, (480) plastic bags
TEMPERATURE - Surveillance Module Model #T100-1
SHIPPING WEIGHT - 890 lbs. (404 KG)
LEGS - 6" (133 mm) Sta. Stl. Adjustable

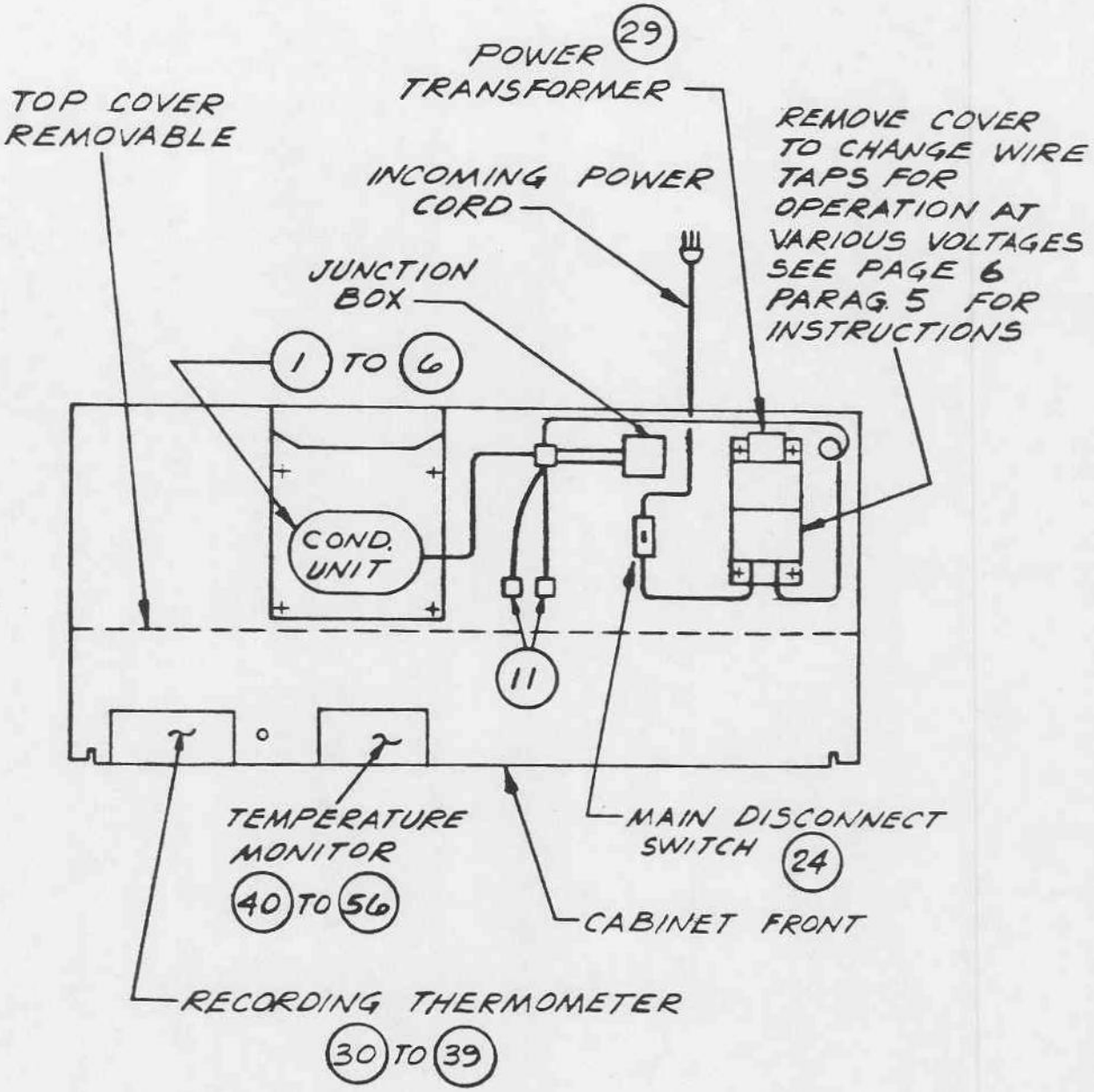
FIG. # 1

PAGE 1

THE JEWETT REFRIGERATOR COMPANY, INC. BUFFALO, NY 14213

FOR MODEL BBR37 BLOOD BANK

DRN BY	D.C.K.	10-21-87	DWG. NO.	SHEET
MECH			SR 1594	M
CHK				



MECHANICAL COMPONENT PARTS LOCATIONS

FIG. #2

REPLACEMENT PARTS LIST

MODEL BBR37 BLOOD BANK REFRIGERATOR

ITEM NO.	PART NO	FSCM	ITEM NAME	QUANTITY PER END ITEM
1	8300MRAC19	594311	Overload, Condensing Unit	1
2	82632	59431	Start Relay, Condensing Unit	1
3	85PS110A75	59431	Start Capacitor, Condensing Unit	1
4	810E006A65	59431	Mtr, Condnsing Unit Fan 115-60-1	1
5	51510	59431	Blade, Condensing Unit Fan	1
6	AE4440A	59431	Motor Compressor 115-60-1	1
7	5021-S	14852	Motor, Unit Cooler Fan 115-60-1	1
8	5101-B	14852	Blade, Unit Cooler	1
9	5054-D	14852	Fan Guard	1
10	71906003	14852	Finned Coil, Unit Cooler	1
11	CTL001	32011	Control, Temperature	2
12	CPY001	32011	Capillary Drier Assemby	1
13	2830-2110	87518	Fastener & Strike Assembly, Door, "Klein"	2
14	2842-1009-1110	87518	Hinge,Door,"Klein" 1- 1/8" Offset	4
15	SR1905-1	32011	Shim, Hinge	4
16	GKT014	32011	Gasket, Door	2
17	AR714-02A	32011	Drawer Slide Assembly	10
18	22-51-SSA	87518	Legs Stnls Stl Adjust, "Klein"	4
19	CHR002	32011	Card Holder, Plastic	5

REPLACEMENT PARTS LIST (Continued)

MODEL BBR37 BLOOD BANK REFRIGERATOR

ITEM NO.	PART NO	FSCM	ITEM NAME	QUANTITY PER END ITEM
20	BTL001	32011	Bottle, Plastic with Cap, 8oz	2
21	780-021	Littelfuse	Switch, N.O. for Unit Cooler	2
22	780-022	Littelfuse	Switch, N.C. for Door Ajar	2
23	SWT003	32011	Switch, Rotary for Interior Light	1
24	1102	Hubbell	Switch, Power S.T.D.P.	1
25	8G1063W	G.E.	Ballast, Fluorescent	1
26	F40C	G.E.	Lamp, Fluorescent	1
27	2776-1048-3000	87518	Lamp Guard, Clear	1
28	HTR001	32011	Heater Element, Condensate	1
29	TFR023	32011	Transformer, 110/220/50/60,1000VA	1

GENERAL INFORMATION

Each Jewett Refrigerator is a complete packaged unit ready to operate when connected to electric power lines. It is not necessary to have a refrigeration serviceman place the unit in service. Each refrigerator has been given a 48-hour test prior to shipment. Read all the instructions first before proceeding with the installation.

This blood bank refrigerator has been designed and engineered in keeping with the recommended standard temperature requirements established by the American Association of Blood Banks, the American National Red Cross and the Food and Drug Administration.

This blood bank refrigerator with a "brain" features a temperature surveillance module which insures safe, continuous monitoring of upper & lower solution temperatures. Stainless steel, removable, adjustable drawers with full extension ball bearing slides provide easy access.

Digital display of upper & lower solution temperature in Celsius.

Monitor indicator lights display low, safe, and high temperature of stored contents.

Dual circulation cooling fan.

Temperature monitor audible signal with timer re-set switch.

Door ajar indicator light and audible signal.

Recording thermometer - 7 day chart.

This blood bank refrigerator is equipped with the following items:

EQUIPMENT PROVIDED

1. T100-1 Temperature Surveillance Module.
2. 8GR1WBR Record Thermometer.
3. Dual Voltage/Cycle Transformer.

See sections on MODULE and RECORDING THERMOMETER for information on these items.

START UP PROCEDURES

1. Move the refrigerator into the desired location, making sure the bottom of the refrigerator is evenly supported. If the cabinet sets on an uneven surface a slight rocking or vibration might result when the condensing unit is set in operation. This model has adjustable legs to compensate for uneven floors. Adjust as required to level cabinet in all directions.

2. Make certain that cabinet is located so that the rear of the mechanical compartment is unobstructed to allow for ventilation for the condensing unit.

NOTE: Minimum of 8" clearance required between ceiling and top of refrigerator to allow for adequate ventilation of mechanical equipment Minimum of 3" clearance at rear.

3. All models have been provided with electric condensate evaporators, located on the back of the cabinet. Periodic cleaning of the condensate pan will assure proper operation. Caution: unit is Hot. Avoid contact with heating elements with refrigerator running.

4. The hermetic sealed condensing unit (1/5 HP) is shipped with all service valves open and ready for operation. Do not adjust valves. The unit is designed to operate on 110 volt, 50/60 cycle, or 220 volt, 50/60 cycle, alternating current. Use of any other electrical characteristics may cause permanent damage to the electrical components.

5. Provide (1) 3-wire grounding type convenience outlet within 6 feet of the junction box located in the condensing unit compartment. Connect refrigerator plug in cord into wall outlet. Make sure main power switch is off (switch is in mechanical space). Be sure the electric line is the proper size to carry the load. Low voltage due to line loss or line overload will cause the compressor overload to cut out. Excessive cycling could cause overheating and damage the motor windings.

   Adjust internal jumpers in transformer as follows:

110V/50 HZ -	A TO	5
	B TO	6
110V/60 HZ -	A TO	6
	B.TO	6
220V/50 HZ -	A TO	3
	B TO	6
220V/60 HZ -	A TO	3
	B TO	5

CAUTION: DO NOT OPEN COVER OF TRANSFORMER WHEN CONNECTED TO POWER SOURCE HAZARDOUS VOLTAGES INSIDE. MAKE SURE POWER SWITCH IS OFF.

OPERATING INSTRUCTIONS

CAUTION: MAKE SURE TRANSFORMER IS SET UP FOR PROPER ELECTRICAL VOLTAGE & FREQUENCY BEFORE PLUGGING IN UNIT

1) REFRIGERATOR IS DESIGNED TO OPERATE AT 110/220V - 50/60HZ - 1 PHASE POWER. OPERATION AT ANY OTHER POWER MAY CAUSE PERMANENT DAMAGE TO MECHANISM. SEE LABEL AT TOP MOUNTED TRANSFORMER FOR INSTRUCTIONS ON ADJUSTMENTS TO SUIT AVAILABLE VOLTAGE & FREQUENCY.

2) THE COOLING COIL FAN RUNS CONTINUOUSLY. THE COIL DEFROSTS AUTOMATICALLY ON COMPRESSOR OFF CYCLE.

3) DUAL TEMPERATURE CONTROLS ARE FACTORY SET TO OPERATE ON 36°F TO 40°F AIR TEMPERATURE. IF ONE CONTROL IS CHANGED, THE SECOND CONTROL MUST BE CHANGED ACCORDINGLY.

4) CLEAN THE FAN COIL OF THE CONDENSING UNIT PERIODICALLY. ALSO CLEAN THE INTERIOR CABINET AND DRAWERS OFTEN, USING WARM WATER AND A GOOD FUNGICIDAL DETERGENT.

This unit is equipped with dual controls and operates at +2° to 4°C (36°F to 40°F). The second temperature control has been installed for extra protection against temperature failures. If one temperature control should fail to close, the second temperature control automatically takes over. If the setting of one temperature control is changed, the second control must be changed accordingly. A reliable serviceman should inspect the controls yearly to assure that both are in good condition. These controls have been factory preset. See Maintenance Section for resetting information. This unit is designed for continuous operation.

To turn off refrigerator, unplug transformer from power source, or turn off power switch.

For operation of MODULE/RECORDING THERMOMETER, see applicable sections.

ADJUSTING TEMPERATURE

Turn dial knob on temperature controls counter-clockwise for warmer operation, clockwise for colder operation. Move dial 1/4 space at a time, allow 2 hours for refrigerator to balance out before adjusting again

EQUIPMENT CARE

1. To protect the cabinet finish as well as the product, the refrigerator should be cleaned often using luke warm water and a good fungicidal detergent to eliminate air borne low temperature growing organisms.

2. The drawers should also be wiped occasionally to prevent the accumulation of any foreign matter. The drawer slides do not require any lubrication.

3. The fan in the unit cooler operates continuously and needs no lubrication.

4. The condensing unit in the top of the cabinet is completely sealed and needs no oiling or other lubrication. However, the finned condensing unit through which air passes can become clogged with lint and other foreign substances in the air. The openings between the fins should be cleaned of lint every few months. A small test tube brush works well for this purpose.

5. An annual inspection of the mechanical refrigerating equipment by a competent service man is recommended, as a mechanic can frequently make adjustments which prevent a breakdown in the future.

See sections on MODULE/RECORDING THERMOMETER for information on these items.

THEORY OF OPERATION

THE BASIC REFRIGERATION CYCLE

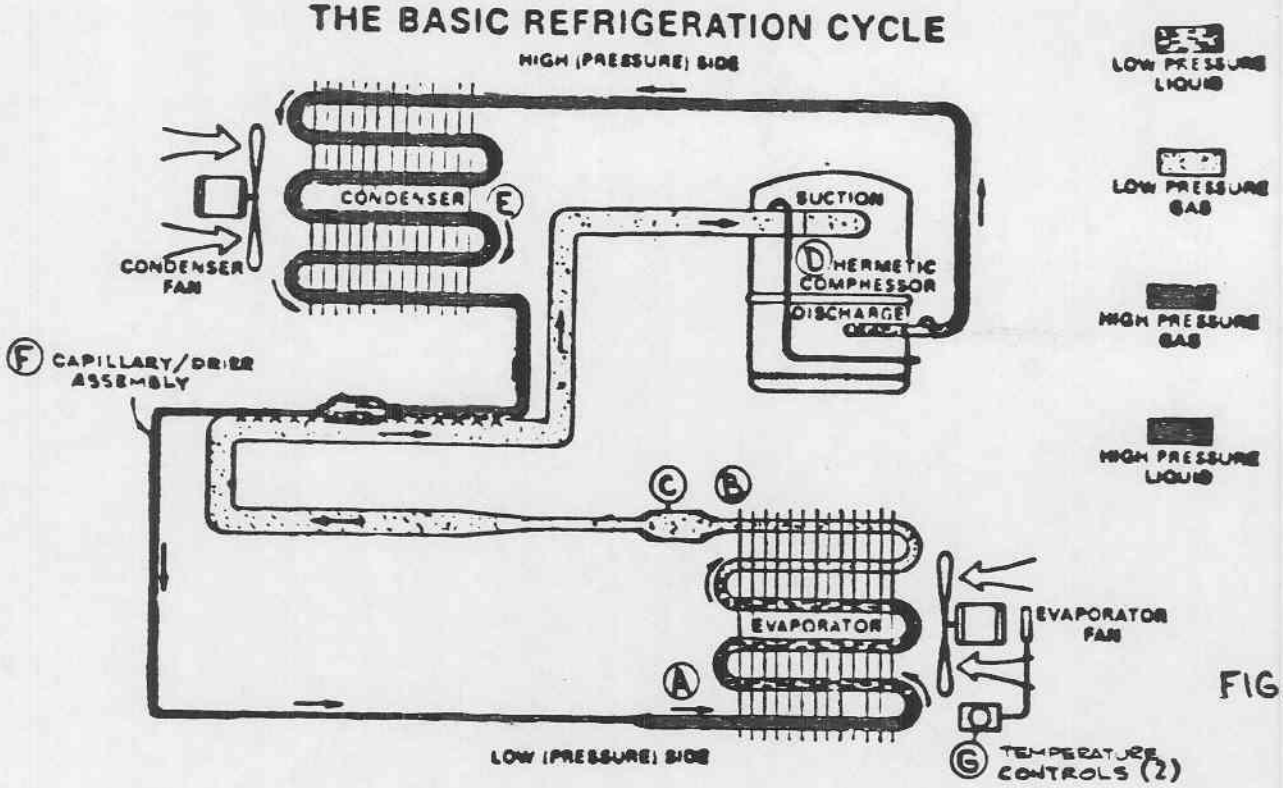


FIG.-3

Mechanical refrigeration is accomplished by continuously circulating, evaporating, and condensing a fixed supply of refrigerant in a closed system. Evaporation occurs at a low temperature and low pressure while condensation occurs at a high temperature and pressure. Thus, it is possible to transfer heat from an area of low temperature (i.e., refrigerator cabinet) to an area of high temperature (i.e., Lab Room).

Beginning the cycle at the evaporator inlet (A) the low pressure liquid expands, absorbs heat, and evaporates, changing to a low pressure gas at the evaporator outlet (B).

The compressor (D) pumps this gas from the evaporator through the accumulator (C), increases its pressure, and discharges the high pressure gas to the condensor (E). The accumulator is designed to protect the compressor by preventing slugs of liquid refrigerant from passing directly into the compressor. An accumulator should be included on all systems subjected to varying load conditions or frequent compressor cycling. In condensor (E) heat is removed from the gas which then condenses and becomes a high pressure liquid.

As the high pressure liquid refrigerant enters the evaporator (A) it is subjected to a much lower pressure due to the suction of the compressor and the pressure drop across the capillary/drier assembly (F). Thus, the refrigerant tends to expand and evaporate. In order to evaporate, the liquid must absorb heat from the air passing over the evaporator.

Eventually, the desired air temperature is reached and the temperature control (G) will break the electrical circuit to the compressor motor and stop the compressor.

As the temperature of the air through the evaporator rises, the temperature control remakes the electrical circuit. The compressor starts, and the cycle continues.

(GENERAL TROUBLE SHOOTING)
SERVICE CHART

	SYMPTOM	POSSIBLE CAUSE	REPAIR
A	Compressor will not start--no hum	1. Line disconnect switch open. 2. Fuse removed or blown. 3. Overload protector tripped. 4. Control stuck in open position. 5. Control off due to cold location. 6. Wiring improper or loose.	1. Close start or disconnect switch. 2. Replace fuse. 3. Refer to electrical section. 4. Repair or replace control. 5. Relocate control. 6. Check wiring against diagram.
B	Compressor will not start--hums but trips on overload protector	1. Low voltage to unit. 2. Starting capacitor defective. 3. Relay failing to close. 4. Compressor motor has a winding open or shorted. 5. Internal mechanical trouble in compressor. 6. Improperly wired.	1. Determine reason and correct. 2. Determine reason and replace. 3. Determine reason and correct, replace if necessary. 4. Replace compressor. 5. Replace compressor. 6. Check wiring against diagram.
C	Compressor starts, but does not switch off of start winding	1. Low voltage to unit. 2. Relay failing to open. 3. Run Capacitor defective. 4. Excessively high discharge pressure. 5. Compressor motor has a winding open or shorted. 6. Internal mechanical trouble in compressor (tight). 7. Improperly wired.	1. Determine reason and correct. 2. Determine reason and correct, replace if necessary. 3. Determine reason and replace. 4. Check discharge shut-off valve, possible overcharge, or insufficient cooling on condenser. 5. Replace compressor. 6. Replace compressor. 7. Check wiring against diagram.
D	Compressor starts and runs, but short cycles on overload protector	1. Excessive discharge pressure. 2. Low voltage to unit (or unbalanced if three phase). 3. Overload protector defective. 4. Run capacitor defective. 5. Compressor too hot--return gas hot. 6. Suction pressure too high. 7. Compressor motor has a winding shorted. 8. Additional current passing through overload protector.	1. Check ventilation, restrictions in cooling medium, restrictions in refrigeration system. 2. Determine reason and correct. 3. Check current, replace protector. 4. Determine reason and replace. 5. Check refrigerant charge (fix leak) add if necessary. 6. Check for possibility of misapplication. Use stronger unit. 7. Replace compressor. 8. Check wiring diagram. Check for added fan motors, pumps, etc., connected to wrong side of protector.

(GENERAL TROUBLE SHOOTING)
SERVICE CHART

	SYMPTOM	POSSIBLE CAUSE	REPAIR
E	Unit runs OK, but short cycles on	1. Overload protector. 2. Thermostat. 3. High pressure cut-out due to: a. insufficient air or water supply. b. overcharge. c. air in system. 4. Low pressure cut-out due to: a. liquid line solenoid leaking. b. compressor valve leak. c. undercharge. d. restriction in expansion device.	1. Replace device. 2. Differential set too close--widen. 3. a. Check air or water supply to condenser--correct. b. Reduce refrigerant charge. c. Purge. 4. a. Replace. b. Replace. c. Fix leak, add refrigerant. d. Replace device.
F	Unit operates long or continuously	1. Shortage of refrigerant. 2. Control contacts stuck or frozen 3. Refrigerated or air conditioned space has excessive load or poor insulation. 4. Dirty Condenser. 5. Evaporator coil iced. 6. Restriction in refrigeration system. 7. System inadequate to handle load. 8. Filter dirty.	1. Fix leak, add charge. 2. Clean contacts or replace control. 3. Determine fault and correct. 4. Clean condenser. 5. Defrost. Check defrost circuit. 6. Determine location and remove. 7. Replace with larger system. 8. Clean or replace.
G	Start capacitor open, shorted or blown	1. Relay contacts not opening properly. 2. Prolonged operation on start cycle due to: a. low voltage to unit. b. improper relay. c. starting load too high. 3. Excessive short cycling. 4. Improper capacitor.	1. Clean contacts or replace relay if necessary. 2. a. Determine reason and correct. b. Replace. c. Correct by using pump down arrangement if necessary. 3. Determine reason for short cycling and correct. 4. Determine correct size & replace.
H	Run capacitor open, shorted or blown	1. Improper capacitor. 2. Excessively high line voltage (110% of rated max.).	1. Determine correct size and replace. 2. Determine reason and correct.
I	Relay defective or burned out	1. Line voltage too high or too low 2. Excessive short cycling. 3. Incorrect relay. 4. Incorrect mounting angle. 5. Relay being influenced by loose vibrating mounting. 6. Incorrect run capacitor.	1. Determine reason and correct. 2. Determine reason for short cycling and correct. 3. Check and replace. 4. Remount relay in correct position. 5. Remount rigidly. 6. Replace with proper capacitor.

(GENERAL TROUBLE SHOOTING)
SERVICE CHART

	SYMPTOM	POSSIBLE CAUSE	REPAIR
J	Space temperature too high	1. Control setting too high. 2. Expansion valve too small. 3. Cooling coils too small 4. Inadequate air circulation.	1. Reset control. 2. Use larger valve. 3. Add surface or replace. 4. Improve air movement.
K	Suction line frosted or sweating	1. Expansion valve passing excess refrigerant or is oversized. 2. Expansion valve stuck open. 3. Evaporator fan not running. 4. Overcharge of refrigerant.	1. Readjust valve or replace with smaller valve. 2. Clean valve of foreign particles, replace if necessary. 3. Determine reason & correct. 4. Correct charge.
L	Liquid line frosted or sweating	1. Restriction in filter drier. 2. Liquid shut-off (king valve) partially closed.	1. Replace part. 2. Open valve fully.
M	Unit noisy	1. Loose parts or mountings. 2. Tubing rattle. 3. Bent fan blade causing vibration. 4. Fan motor bearing worn.	1. Find and tighten. 2. Reform to be free of contact. 3. Replace blade. 4. Replace motor.
N	Unit cools but does not get to set point	1. Fan not operating.	1. Check door switch. a. Check to see if door switch actuator (angle) is depressing switch.

NOTE: Jewett Refrigerators and Freezers are designed to operate in areas that are heated to 60°F. Installation in unheated areas may require a low temperature compressor protection kit for satisfactory operation.

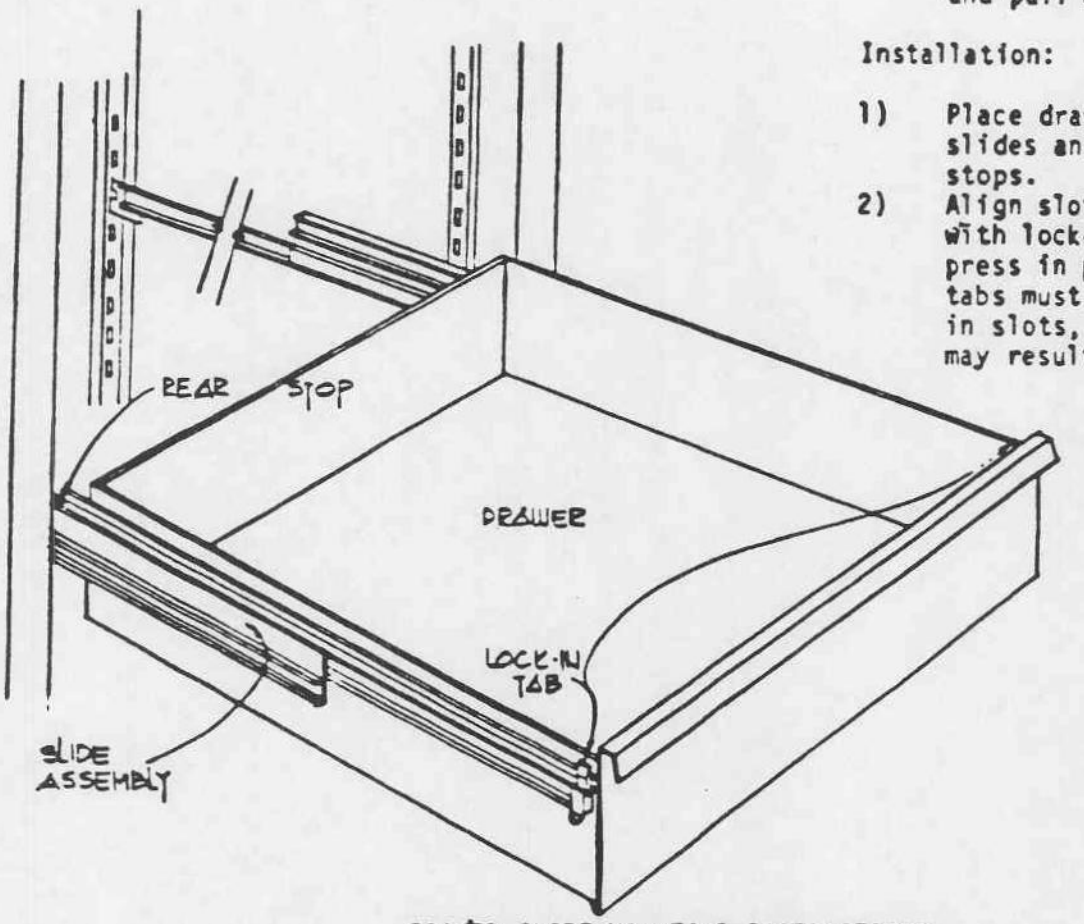
REMOVAL OR INSTALLATION OF DRAWERS

For Models With Drawers

1) Press lock-in tabs inward towards drawer side.
2) Lift front of drawer up and pull clear of slides.

Installation:

1) Place drawer on top of slides and push into rear stops.
2) Align slot in drawer slide with lock-in tabs and press in place. Lock-in tabs must be fully engaged in slots, otherwise damage may result to door pan.



DRAWER SLIDE MOUNTING INSTRUCTIONS

Step #1: Push into slots in rear standard. Make certain that opposite drawer slides are in the same slots in the opposite standards.

Step #2: Push into slots in front standard and press down. If necessary, tap into place.

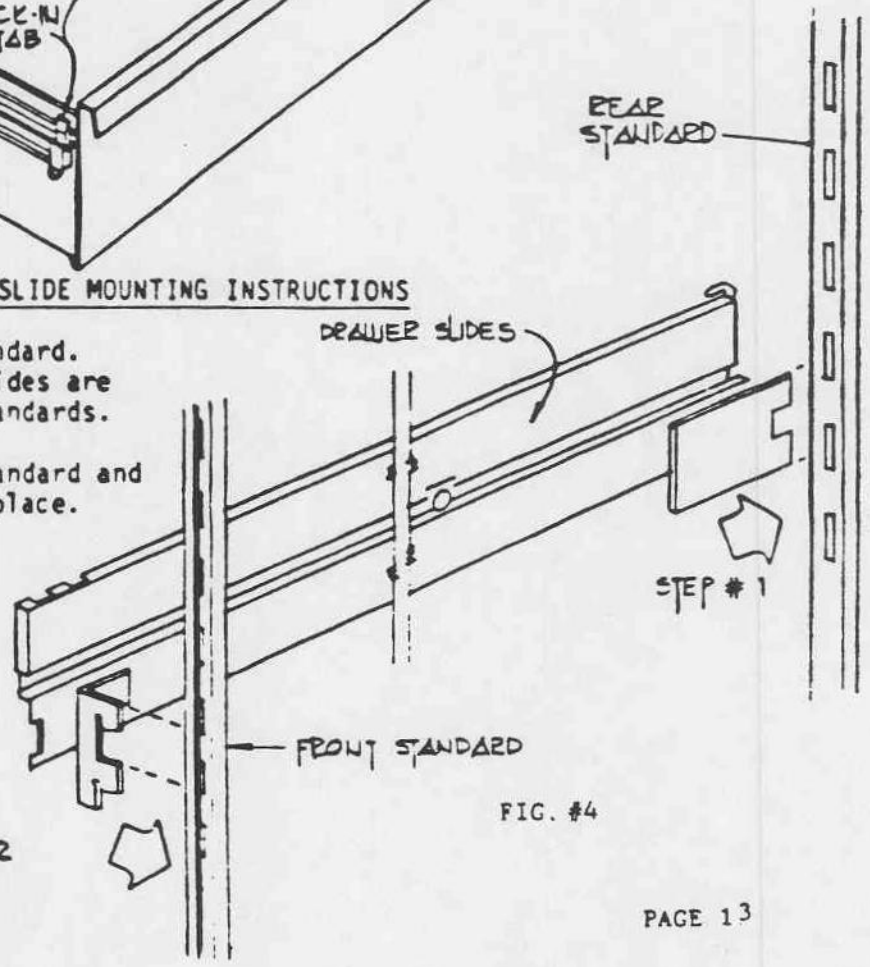


FIG. #4

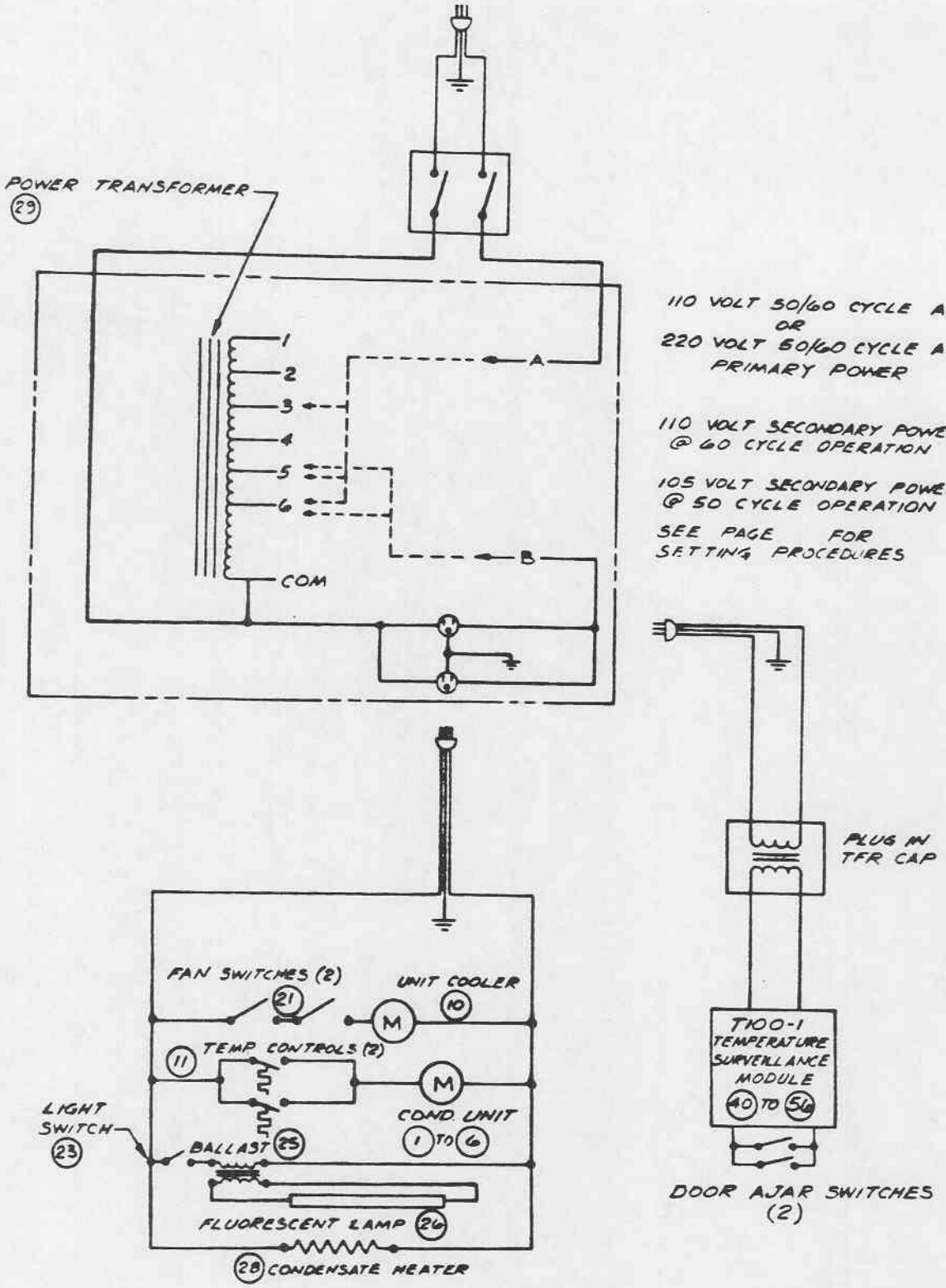

POWER TRANSFORMER
29
1
2
3
4
5
6
A
B
COM
110 VOLT 50/60 CYCLE A C
OR
220 VOLT 50/60 CYCLE A C
PRIMARY POWER
110 VOLT SECONDARY POWER
@ 60 CYCLE OPERATION
105 VOLT SECONDARY POWER
@ 50 CYCLE OPERATION
SEE PAGE FOR
SETTING PROCEDURES
PLUG IN
TFR CAP
T100-1
TEMPERATURE
SURVEILLANCE
MODULE
40 TO 50
DOOR AJAR SWITCHES
(2)
FAN SWITCHES (2)
21
UNIT COOLER
10
M
11
TEMP CONTROLS (2)
M
LIGHT
SWITCH
23
BALLAST
25
COND. UNIT
1 TO 6
FLUORESCENT LAMP
24
28
CONDENSATE HEATER

FIG. #5

STORAGE INSTRUCTIONS

If these refrigerators are to be stored, they must be kept in a controlled environment. Indoor storage is required with the temperature kept within a range of -20°F. to +120°F. (-29°C. to +49°C.).

Extended storage time may have an affect on the batteries located in the temperature module, as batteries have a limited shelf life. These batteries are of the rechargeable type and are automatically charged when the temperature module is on. If after 45 to 50 hours of use the batteries fail to hold a charge, they must be replaced with fresh batteries.

The only other component that may be affected by extended storage would be the pen arm located in the recording thermometer. After prolonged storage the pen arm may dry out and require replacement.

7-Day Recording Thermometer

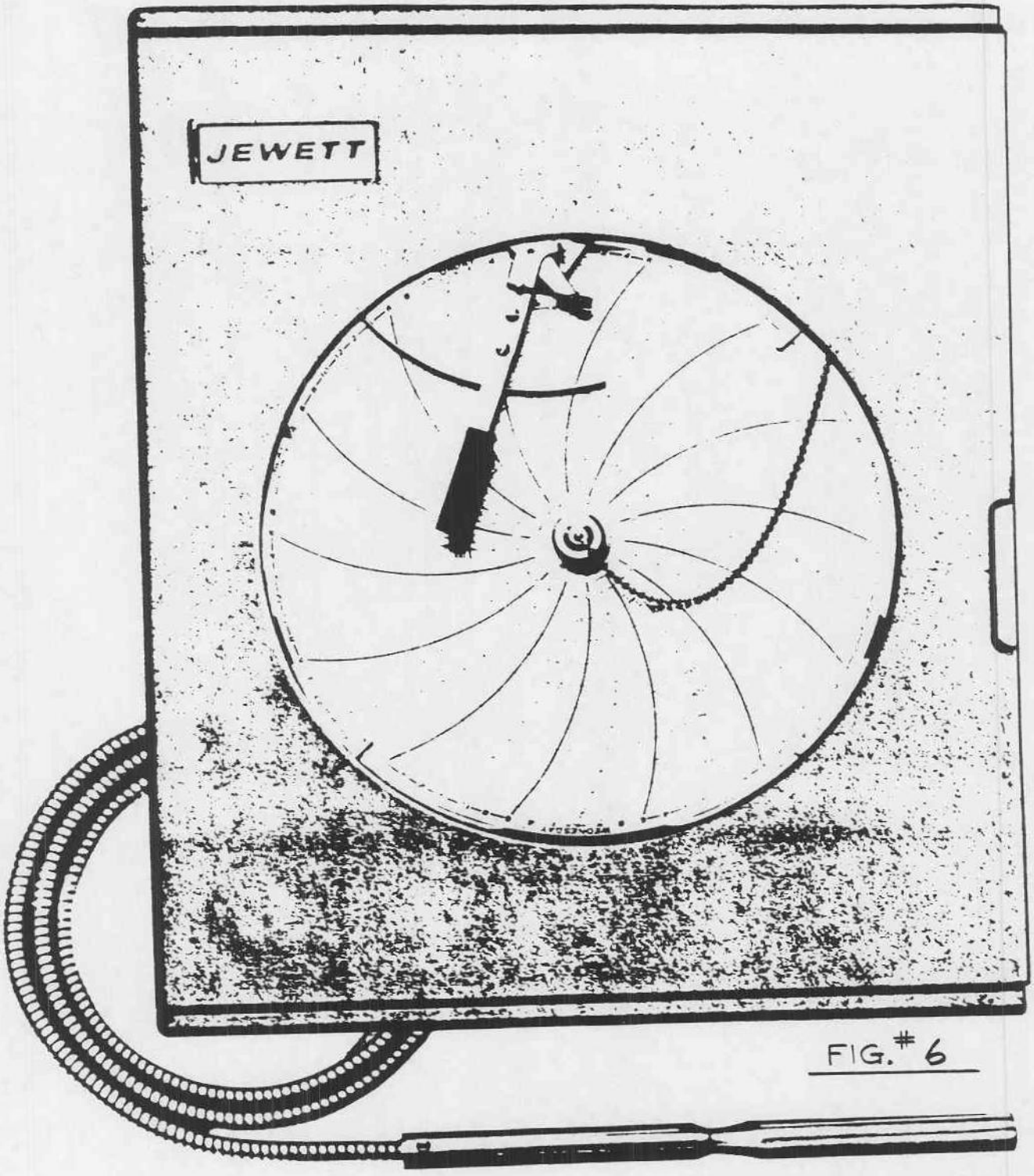
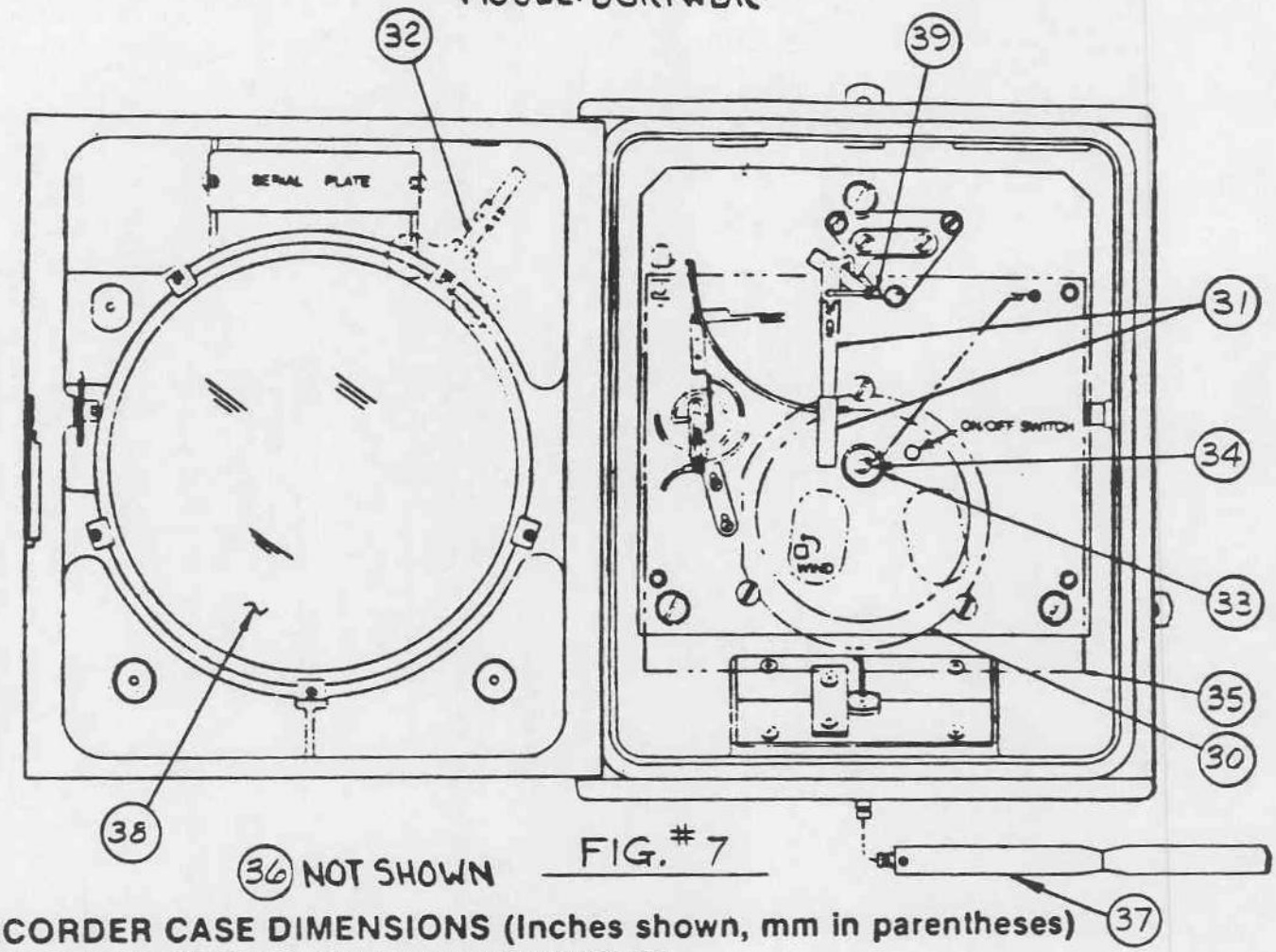


FIG. # 6

Model 8GR1WBR for Refrigerators

7-DAY RECORDING THERMOMETER
MODEL: 8GR1WBR

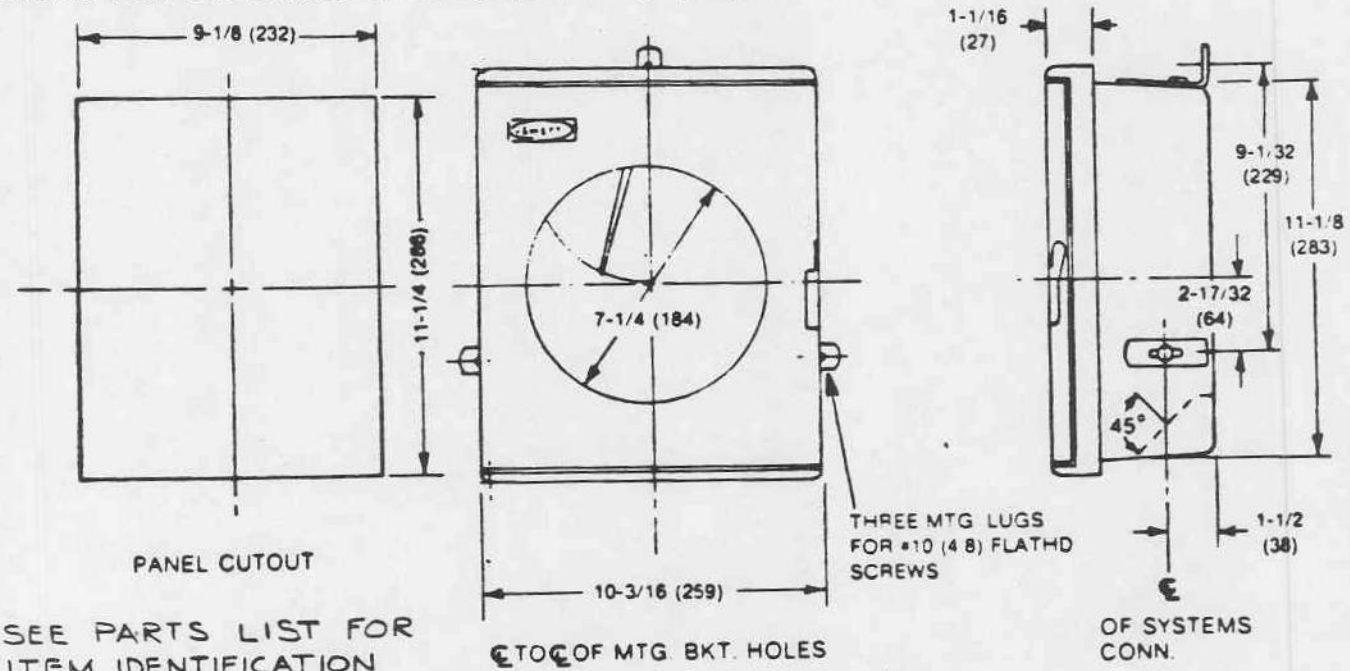


36 NOT SHOWN

FIG. # 7

RECORDER CASE DIMENSIONS (Inches shown, mm in parentheses)

Overall case size is 10-1/8 (257) wide x 12-3/8 (314) high x 4-15/16 (125) deep.



SEE PARTS LIST FOR ITEM IDENTIFICATION

FIG. # 8

REPLACEMENT PARTS LIST

MODEL 8GR1WBR FOR RECORDING THERMOMETER

ITEM NO.	PART NO	FSCM	ITEM NAME	QUANTITY PER END ITEM
30	RDR010	32011	CHART DRIVE - 7 DAY SPRING WOUND	1
31	RDR024	32011	MARK-A-MATIC II KIT CONSISTING OF: (6) DISPOSABLE PENS (1) PEN ARM	1
32	RDR027	32011	KEY, WINDING, CHART DRIVE	1
33	RDR013	32011	KNOB, CHART WITH BEADED CHAIN	1
34	RDR006	32011	HUB, CHART	1
35	RDR044	32011	PLATE, CHART	1
36	RDR019	32011	CHART (J7-12+43-8) 100	
37	RDR005	32011	THERMAL SYSTEM (-12 to +43°C)	1
38	RDR003	32011	GLASS, DOOR	1
39	RDR007	32011	SCREW, MICROMETER ADJUSTMENT (PEN ARM)	1

GENERAL INFORMATION

The Jewett 7-day Recording Thermometer is a sensitive and specially designed instrument for keeping permanent and accurate blood temperature records. It provides uninterrupted observation of stored blood temperatures pathologists require to determine the extent of damage that can be caused by temperature fluctuations. They can then decide whether the blood can still safely be used. This is a necessary feature for modern blood banks in answering any technical or legal questions that may arise.

The Jewett Recording Thermometer records in Celsius readings.

This 7-day spring-wound instrument features the Mark-a-Matic II continuous flow inking system. Each fiber-tipped pen has its own sealed, specially formulated ink supply and provides up to 8 months of fine line temperature recording. This pen has a sealed, self-contained ink supply that is specially formulated to insure continuous flow without skipping or blotting. The flexible stainless steel pen arm easily inserts into pen and is attached to the recording thermometer by two screws. A temperature sensitive stainless steel encapsulated sensor is immersed in liquid. In the event of a power failure, there is a complete record of the rise of temperature while the current is off, as well as its fall with the restoration of power. The unit is furnished with 100 8-inch centigrade charts.

STANDARD FEATURES

Jewett offers a recording device that features:

- Mark-a-Matic inking system.
- Stainless steel sensor.
- Stainless steel armoured capillary cable.
- 7-day spring-wound mechanism. Insures continuous record of temperature fluctuations in event of power failure.
- Continuous accurate record-keeping on quick, easy-to-read charts.
- 100 8" (203 mm) charts supplied with each recorder.
- Chart number RDR019 charts (-12°C to +43°C).

GENERAL INFORMATION

A. Read instructions carefully before using the instrument.

B. The recorder is shipped with the following accessories.

One box of 100 charts
One chart drive winding key

C. When ordering replacement parts, refer to the part name and number in the parts list. Always specify model and serial number when ordering.

This instrument is guaranteed to function under all normal conditions. With proper care it will render lasting accurate service.

CAPILLARY TUBING

Avoid bending the tubing sharply. All excess tubing is coiled and installed inside mechanical compartment.

CALIBRATION

This recorder has been accurately calibrated at the factory. Before making any adjustments, the instrument should be in operation for at least 48 hours. Thereafter, should any adjustment be necessary, check the recorder's temperature readings against an accurate test thermometer.

This is done by placing the bulb of the test thermometer alongside the bulb of the recorder, in a well agitated liquid bath. Then compare the readings after the bulbs have been held in the bath for five (5) minutes. If the recorder does not check with the test thermometer, correction can be made by means of the adjusting screw at the upper right of the pen arm. If sufficient correction cannot be obtained in this manner, it is recommended that the factory be notified, giving exact details including model and serial number. Do not ship the recorder back to the factory for readjustment or repair without written authorization from the factory.

CHART DRIVE (MECHANICAL)

Wind the chart drive each time when changing the chart. With the chart removed, insert the winding key through the hole in the chart plate and wind arbor in the direction indicated by the arrow on the plate. DO NOT OVERWIND. An observation cutout has been provided in the chart plate to observe the balance wheel to ascertain whether the chart drive is operating. Be sure on/off switch located under chart plate is in the "on" position.

If the chart does not start after winding, reinsert the key and release suddenly after winding the chart drive fully. Repeat if necessary.

PEN LIFTER

A pen lifter has been provided to raise the pen off the chart whenever required. The pen is raised by pulling on the metal tab located at the upper left-hand corner of the chart plate. The pen is lowered by depressing the tab.

(continuation)

REPLACEMENT OF CHARTS

Raise the pen lifter as far as it will go. This will provide approximately 1/2" (13 mm) of clearance for the removal of the chart. To remove the chart, unscrew the knob at the center of chart. Position the new chart so that the correct time line coincides exactly with the red pointer on the chart plate. Then replace center chart knob and screw tightly against chart. Lower pen gently onto chart by depressing pen lifter fully. A small dot of ink appearing where the pen point touches the chart will indicate that the pen will trace properly.

INKING PEN

The pen system consists of a self-contained ink reservoir with a porous plastic stylus which is slipped onto the outboard end of the pen arm, firmly. Two screws are provided at the upper end of the pen arm to provide adjustment of its length so that the pen tracks the time line on the chart. Check this after each replacement of the pen and adjust accordingly. Remove colored cap. If stylus does not quite touch the chart, adjustment can be made by slightly bending the pen arm in the center. Do not have more pressure than necessary to make a fine line.

NOTE: AS THE INK SUPPLY NEARS EXHAUSTION, THE INK COLOR BECOMES LIGHTER. THIS INDICATES THAT THE PEN SHOULD BE REPLACED.

REMOVAL OF CHART PLATE

To remove the chart plate, insert index fingers into the openings at the lower left and right hand corners of the chart plate. Press upward against the top of the spring loaded chart plate posts with thumbs and lift the chart plate off the posts. Push the chart plate towards the top of the recorder and remove.

To replace chart plate, position the openings at the upper edge of the chart plate on the upper chart plate posts. This will locate the chart plate correctly over the lower plate posts. Then snap it into position by depressing lower edge.

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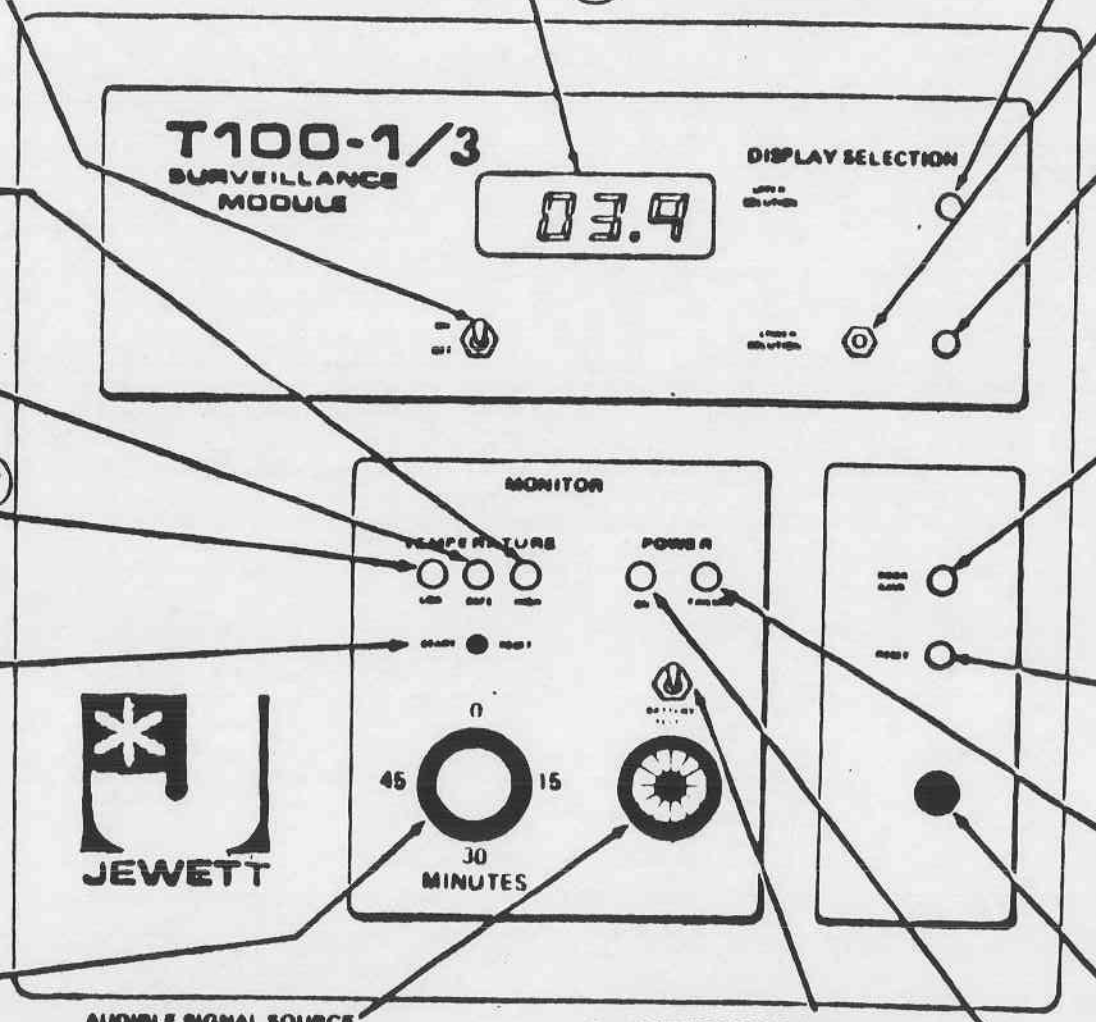

(53) **DISPLAY ON/OFF SWITCH**
Controls power to digital display only.

DIGITAL DISPLAY
Displays DEGREES C as measured by the selected temperature sensor.

(49) (51) **UPPER SOLUTION**
When this green LED is illuminated the digital display provides a reading of the temperature from the sensor in the upper solution.

(55) **SELECTION PUSHBUTTON SWITCH**
This switch when pressed is used to momentarily display a reading of solution temperature in the lower section of the refrigerator

(48) (52) **TEMPERATURE HIGH**
When this red LED is illuminated the temperature in the upper solution is higher than the high limit +6°C in blood bank refrigerator.

LOWER SOLUTION
When this green LED is illuminated the digital display provides a reading of the temperature from the sensor in the lower solution.
(49) (51)

(49) (51) **TEMPERATURE SAFE**
When this green LED is illuminated, the temperature in the upper solution is in the safe range

(48) (52) **TEMPERATURE LOW**
When this red LED is illuminated the temperature in the upper solution is lower than the low limit +1°C. in blood bank refrigerators

(48) (52) **DOOR AJAR**
This red LED flashes whenever the door is open or ajar (not completely closed) Sound will commence pulsing in three minutes (± 30 seconds) after door is initially opened

(54) **TO SILENCE**
When this switch is momentarily pushed to the start position-the audible signal will be silenced for a period corresponding to the setting on the time control below. When this switch is momentarily pushed to the reset position-the audible signal function will be automatically reset to "O" The switch will return to center position.

(55) **RESET PUSHBUTTON SWITCH**
This switch is used to reset the DOOR AJAR timer to provide an additional silence period before the audible signal operates again

(48) (52) **POWER FAILURE**
This red LED flashes if primary power fails or the BATTERY TEST switch is in the down position

(40) **AUDIBLE SIGNAL SILENCE TIMER**
This control sets the silence period for the audible signal

(56) **FUSE**
This fuse will open if excessive current flows from the power supply

(41) **AUDIBLE SIGNAL SOURCE**
This device provides a continuous sound when the temperature in the upper solution exceeds the upper or lower limit or a pulsing sound when there is a power failure or door ajar condition. Sound resulting from door ajar is delayed approximately ± 30 seconds.

(53) **BATTERY TEST SWITCH**
This switch is normally in the up (On) position. When operated to the down position all display indication is extinguished. The POWER FAILURE LED flashes and the audible device provides a pulsing sound.

POWER ON
This green LED is illuminated when the primary AC power is present and the BATTERY TEST switch is in the up (On) position
(49) (51)

NOTE: T100-1 is for refrigerator use, temperature alarm at +1°C and +6°C.

FIG. #9

TEMPERATURE SURVEILLANCE MODULE

T100 CONNECTION DIAGRAM

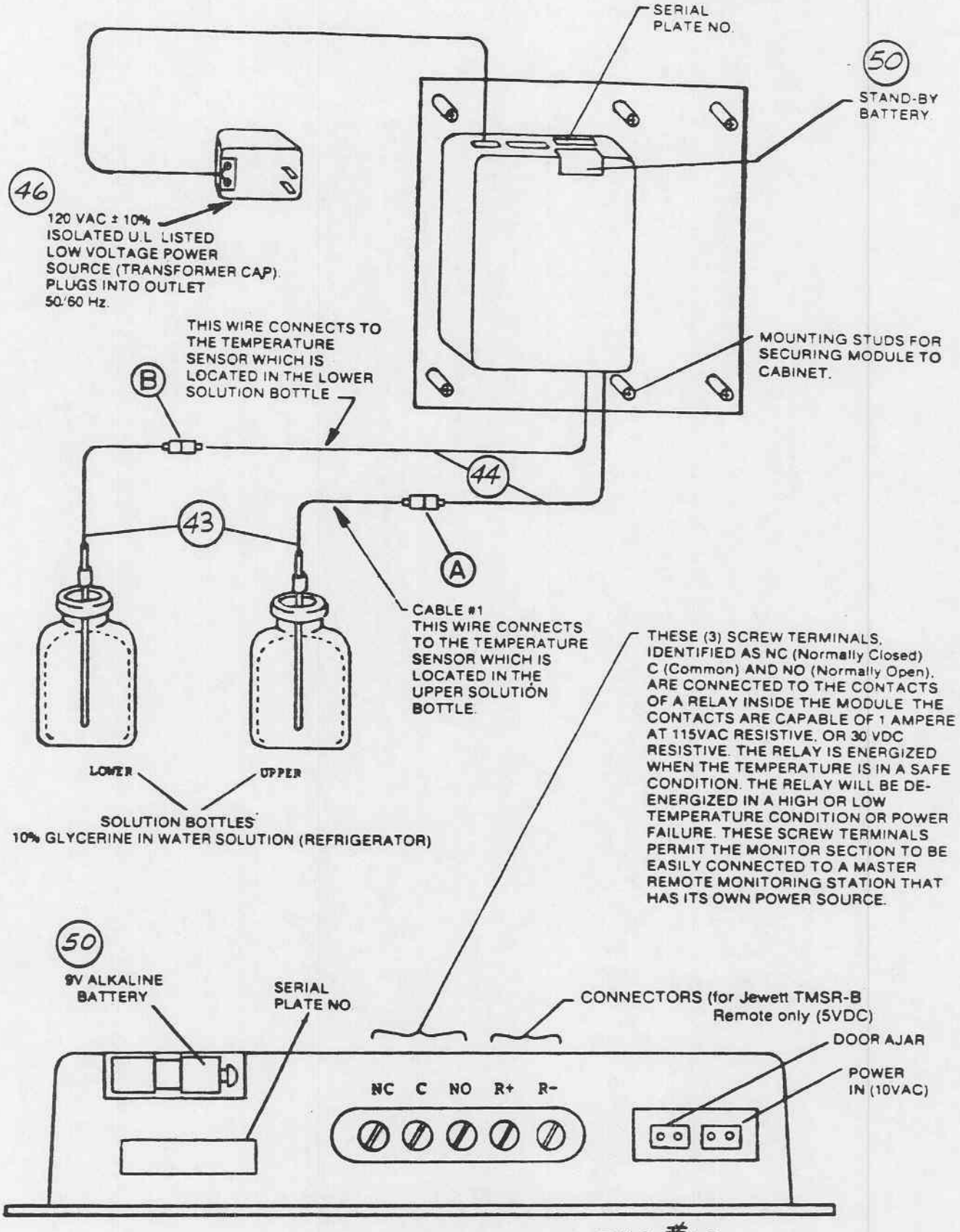
SERIAL PLATE NO.
50
STAND-BY BATTERY
46
120 VAC ± 10% ISOLATED U.L. LISTED LOW VOLTAGE POWER SOURCE (TRANSFORMER CAP). PLUGS INTO OUTLET 50/60 Hz.
THIS WIRE CONNECTS TO THE TEMPERATURE SENSOR WHICH IS LOCATED IN THE LOWER SOLUTION BOTTLE
B
MOUNTING STUDS FOR SECURING MODULE TO CABINET.
44
43
A
CABLE #1 THIS WIRE CONNECTS TO THE TEMPERATURE SENSOR WHICH IS LOCATED IN THE UPPER SOLUTION BOTTLE.
LOWER
UPPER
SOLUTION BOTTLES 10% GLYCERINE IN WATER SOLUTION (REFRIGERATOR)
THESE (3) SCREW TERMINALS, IDENTIFIED AS NC (Normally Closed) C (Common) AND NO (Normally Open), ARE CONNECTED TO THE CONTACTS OF A RELAY INSIDE THE MODULE. THE CONTACTS ARE CAPABLE OF 1 AMPERE AT 115VAC RESISTIVE, OR 30 VDC RESISTIVE. THE RELAY IS ENERGIZED WHEN THE TEMPERATURE IS IN A SAFE CONDITION. THE RELAY WILL BE DE-ENERGIZED IN A HIGH OR LOW TEMPERATURE CONDITION OR POWER FAILURE. THESE SCREW TERMINALS PERMIT THE MONITOR SECTION TO BE EASILY CONNECTED TO A MASTER REMOTE MONITORING STATION THAT HAS ITS OWN POWER SOURCE.
50
9V ALKALINE BATTERY
SERIAL PLATE NO.
CONNECTORS (for Jewett TMSR-B Remote only (5VDC)
DOOR AJAR
POWER IN (10VAC)
NC C NO R+ R-
TOP VIEW

FIG. #10

REPLACEMENT PART LIST

MODEL #T100 TEMPERATURE SURVEILLANCE MODULE

ITEM NO.	PART NO	FSCM	ITEM NAME	QUANTITY PER END ITEM
40	MOD-D0005	32011	TIMER ASSEMBLY	1
41	MOD-D0006	32011	AUDIBLE ASSEMBLY	1
42	MOD-D0003	32011	MAIN BOARD ASSEMBLY	1
43	MOD-D0008	32011	THERMISTOR SENSOR ASSY	2
44	MOD-D0009	32011	THERMISTOR CABLE ASSY	2
45	MOD-D0010	32011	DOOR AJAR PLUG ASSEMBLY	1
46	MOD-D0011	32011	POWER SUPPLY ASSEMBLY	1
47	MOD-D0001	32011	CALIBRATION PLUG	1
48	MOD-D0012	32011	LENS, RED	4
49	MOD-D0013	32011	LENS, GREEN	4
50	522	EVER-READY	BATTERY, ALKALINE 9VDC	1
51	HLMP-3502	HEWLETT-PACKARD	LED, GREEN	4
52	HLMO-3300	HEWLETT-PACKARD	LED, RED	4
53	7101SYCBE	C & K	SWITCH, ON/OFF - BATT. TEST	2
54	7105SYCQE	C & K	SWITCH, START/RESET	1
55	MSPS-103C-2	ALCO-SWITCH	SWITCH, DOOR AJAR - LOWER SOLUTION	2
56	AGC1, 250V	BUSS	FUSE	1

GENERAL INFORMATION:
JEWETT TEMPERATURE SURVEILLANCE MODULE

The Jewett Temperature Surveillance Module is a sophisticated precision electronic instrument. Its primary purpose is to assure the user of stored product safety. The module is designed to be a separate and distinct system which operates and functions independently from the refrigeration control system.

Five (5) basic functions are performed by the module:

1. Constant, 24 hour, surveillance of temperature within the refrigerator cabinet.

2. Constant display of solution (or product) temperature with provision for user to select and momentarily display temperature in another location within the refrigerator cabinet.

3. Constant monitoring of the presence of primary power to the refrigerator.

4. A DOOR AJAR status indicator.

5. Low battery indication.

The monitoring of these five key areas and the automatic warning and specific indentification of a malfunction permits immediate corrective action to be taken by responsible persons to eliminate dangerous and costly stored product spoilage.

INITIAL STARTUP OF MODULE

1. Remove sensor (A) from the 8 oz. plastic bottle in the upper refrigerator cabinet interior. Fill the bottle with 10% glycerine in water solution. Insert sensor (A) into bottle, making certain that the sensor is immersed into the liquid until the solution is within 1/2" of the top of the bottle.

   Note: To reduce evaporation of liquid, seal the top of the bottle opening with plastic cover provided.

2. Remove sensor (B) from the plastic bottle in the lower refrigerator cabinet interior and proceed as in step 5 above.

3. Connect stand-by battery (9VDC alkaline) located on top of the module rear protective/dust cover by clipping the polarized wiring adaptor to the battery terminals.

4. Module is now electrically and mechanically installed.

OPERATION OF THE MODULE

Page 22 Fig #9 of this manual illustrates and identifies the location of various operational functions. The module face panel has three sections: 1-Display, 2-Monitor, 3-Door Ajar. When all monitored functions are in the safe condition, the following indications are identified by the module:

MONITOR SECTION

This section (which is the heart of the module) monitors the temperature of the upper solution within the refrigerator cabinet and presence or absence of primary power. The temperature monitoring is performed by a thermistor sensor. This section also includes the audible signal device, a battery test switch and a timed audible silencing switch. With all conditions safe, the green LED safe temperature lamp is illuminated and the green LED power ON lamp is illuminated. To perform a battery test, actuate the BATTERY TEST SWITCH. This will cause the extinguishing of all display indication and the flashing of the red power failure lamp, the audible signal will emit a pulsing sound.

DIGITAL DISPLAY SECTION

With the ON/OFF switch in the normal ON position, the digital display indicates the temperature of the upper solution within the refrigerated cabinet and the green LED upper solution lamp is illuminated. To display the lower solution temperature, depress the lower solution push button switch. The instrument now senses and momentarily displays lower solution temperature within the lower section of the cabinet. This mode of operation is indicated by the extinguishing of the green LED upper solution lamp and the illumination of the green LED lower solution lamp. After momentary display, the unit automatically returns to displaying the upper solution temperature. In this mode, the green LED lower solution lamp is extinguished and the green LED upper solution lamp is illuminated.

DOOR AJAR SECTION

This section consists of a red LED Door Ajar lamp, a reset pushbutton switch and a fuse. When the refrigerator door is properly closed, no indication is present. Whenever the door is intentionally or unintentionally open (ajar) the red LED Door Ajar lamp will flash. If the door remains open for approximately three (3) minutes (+ 30 seconds), a pulsing audible signal will be heard. If it is necessary for the door to remain open after the audible signal sounds, depress the door alarm reset push-button and the audible signal will be silenced for an additional three minutes.

LOW BATTERY CONDITION

When the stand-by battery requires replacement, a pulsating audible signal will sound and the Power Failure LED will be illuminated (Power ON LED will also be on).

ALARM CONDITIONS

When an unsafe condition occurs, the monitor section warns of unsafe conditions and identifies the type of failure. The following will cause an alarm condition:

The upper solution temperature becomes unsafe, (either too high or low). When an unsafe temperature occurs, the green LED safe temperature lamp is extinguished and the appropriate red LED lamp, high or low, is illuminated indicating the nature of the temperature alarm. The audible device emits a continuous sound. The audible output may be silenced for a period of 0 to 45 minutes by setting the silence timer and then moving the start switch to "Start". When the temperature returns to a safe condition, the module automatically indicates a safe condition.

If the primary power source to the refrigerator fails, the green LED power ON lamp is extinguished, the red LED power failure lamp flashes and the audible signal emits a pulsing sound. The audible can be silenced by the timed audible silencing switch. When power is restored, the module automatically indicates safe condition.

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TROUBLE-SHOOTING CHART
Model Series T100-1

	CONDITION INDICATED ON INSTRUMENT DIGITAL TEMPERATURE DISPLAY SECTION				POSSIBLE CAUSE	SUGGESTED REPAIR
	DIGITAL DISPLAY LAMP	UPPER SOLUTION LAMP	LOWER SOLUTION SWITCH	LOWER SOLUTION PUSH BUTTON		
1.	On-Reading Correct	On	Off	Pressed Momentarily	Push Button Switch or Circuit Malfunction.	Replace Switch or Contact Jewett Service
2.	On-Reading Correct	Off	Off	Not Pressed Momentarily	Upper Lamp or Circuit Malfunction.	Replace Lamp or Contact Jewett Service
3	On-Reading Correct	Off	Off	Pressed Momentarily	Lower Lamp or Circuit Malfunction	Replace Lamp or Contact Jewett Service
4.	On-Reading Correct	On	On	Pressed or Not Pressed	Circuit Malfunction	Contact Jewett Service
5	On-Reading Correct	Off	On-But Recycles to Upper Lamp Immediately	Pressed Momentarily	Circuit Malfunction.	Contact Jewett Service
6	On-Reading Incorrect	On	Off	Not Pressed	Upper Solution Thermistor Sensor or Circuit Malfunction.	Check Calibration Replace Sensor or Contact Jewett Service
7	On-Reading Incorrect	Off	On	Pressed Momentarily	Lower Solution Thermistor Sensor or Circuit Malfunction.	Check Calibration Replace Sensor or Contact Jewett Service

	CONDITION INDICATED ON INSTRUMENT DIGITAL TEMPERATURE DISPLAY SECTION				POSSIBLE CAUSE	SUGGESTED REPAIR
	DIGITAL DISPLAY LAMP	UPPER SOLUTION LAMP	LOWER SOLUTION SWITCH	LOWER SOLUTION PUSH BUTTON		
8	On-Reading -12.6	On	Off	Not Pressed	Upper Solution Sensor Disconnected or Open Circuit	Connect Sensor or Contact Jewett Service
9.	On-Reading -12.6	Off	On	Pressed Momentarily	Lower Solution Sensor Disconnected or Circuit Malfunction	Connect Sensor or Contact Jewett Service
10.	Off	On	Off	Not Pressed	Digital Meter Switch Off or Meter Malfunction	Turn Switch On or Contact Jewett Service
11.	Off	On	Off	Pressed Momentarily.	Digital Meter Switch Off or Meter Malfunction	Turn Switch On or Contact Jewett Service
12.	Reading Minus Rather Than Plus Temperature	On	Off	Not Pressed	Meter Malfunction (Ascertain that Actual Temperature is Plus)	Contact Jewett Service
13.	As Above	Off	On	Pressed Momentarily	As Above	Contact Jewett Service
14.	Segment of Any	Either Condition	Either Condition	Either Condition	Meter Malfunction	Contact Jewett Service
15.	Decimal Point Out	Either Condition	Either Condition	Either Condition	Meter Malfunction	Contact Jewett Service

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TROUBLE-SHOOTING CHART
Model Series T100-1

DOOR AJAR SECTION				POSSIBLE CAUSE	SUGGESTED REPAIR
DOOR AJAR LED	RESET	AUDIBLE	DOOR STATUS		
On Pulsing	Not Pressed In	Pulses at Proper Time	Closed	Reset switch Malfunction, Door Switch Malfunction, Circuit Malfunction	Replace Reset Switch, Replace Door switch, Contact Jewett Service
On Constant	Not Pressed In	Off	Open	Circuit Malfunction	Contact Jewett Service
On Constant	Not Pressed	On Constant	Open	Circuit Malfunction	Contact Jewett Service
On Pulsing	Not Pressed In	Off (Never Pulses)	Open	Circuit Malfunction	Contact Jewett Service
On Pulsing	Not Pressed	On immed (No Delay)	Open	Circuit Malfunction	Contact Jewett Service
Off	Not Pressed In	Off (Never Pulses)	Open	Reset Switch Malfunction, Door Switch Circuit Malfunction	Replace Switch or Contact Jewett Service
Off	Not Pressed In	Pulses at Proper Time	Open	Lamp Defective or Circuit Malfunction	Replace Lamp or Contact Jewett Service
Off	Not Pressed In	Off (Never Pulses)	Open	Door Switch Malfunction or Wire Open to Unit	Replace Switch Correct Open Circuit

CONDITION INDICATED ON MONITOR SECTION									POSSIBLE CAUSE	SUGGESTED REPAIR
TEMPERATURE				POWER		AUDIBLE	TIMER	BATTERY		
	LIGHTS			LIGHTS		Sound	Silence	Test Switch		
Cabinet	Low	Safe	High	On	Failure					
Safe	Off	On	Off	On	Off	Off	Zero Time	Up	Normal Operation	None
Safe	Off	On	Off	On	Flashing Light	Pulsing Sound	Zero Time	Up	Battery Weak	Replace Battery
Safe	Off	Off	Off	Off	Flashing Light	Pulsing Sound	Zero Time	Up	Transformer Cap Unplugged, Fuse Open	Plug in Transformer Cap Replace Fuse
Safe	Off	On	Off	Off	Off	Off	Zero Time	Up	Power on LED not lighting, Circuit Malfunction	Replace LED on Circuit board, Contact Jewett Service
Safe	Off	Off	Off	On	Off	Off	Zero Time	Up	Safe LED not lighting, Circuit Malfunction	Replace LED on Circuit board, Contact Jewett Service
Too Cold 15° C	Off	Off	Off	On	Off	Off	Zero Time	Up	Low LED not lighting, Circuit Malfunction	Replace LED on Circuit board, Contact Jewett Service
Too Warm 5.5° C	Off	Off	On	On	Off	Off	Zero Time	Up	High LED not lighting Circuit Malfunction	Replace LED on Circuit Board, Contact Jewett Service
Safe	Off	Off	Off	Off	On	Off	Zero Time	Up	Audible device Malfunction, Circuit Malfunction	Replace Audible Device Contact Jewett Service

TROUBLE-SHOOTING CHART
Model Series T100-1

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CONDITION INDICATED ON MONITOR SECTION									POSSIBLE CAUSE	SUGGESTED REPAIR
TEMPERATURE				POWER		AUDIBLE	TIMER	BATTERY		
	LIGHTS			LIGHTS						
Cabinet	Low	Safe	High	On	Failure	Sound	Silence	Test Switch		
High Or Low	On	Off	On	On	Off	On	45 Min.	Up	Timer Malfunction, Start / Reset Switch Malfunction.	Replace Timer, Replace Start / Reset Switch, Contact Jewett Service
Safe	On	On	On	On	On	On	Zero Time	Up	Circuit Malfunction	Contact Jewett Service
Safe	On	On	Off	On	On	On	Zero Time	Up	Circuit Malfunction	Contact Jewett Service
Safe	Off	On	On	On	On	On	Zero Time	Up	Circuit Malfunction	Contact Jewett Service
Safe	On	On	On	Off	On	On	Zero Time	Up	Circuit Malfunction	Contact Jewett Service
Safe	On	Off	On	Off	On	On	Zero Time	Up	Circuit Malfunction	Contact Jewett Service
Safe	Off	Off	Off	Off	Con-stant On	Con-stant On	Zero Time	Down	Circuit Malfunction	Contact Jewett Service

CONDITION INDICATED ON VOLTMETER OR OHMMETER MEASUREMENT REMOTE OUTPUT CIRCUIT				POSSIBLE CAUSE	SUGGESTED REPAIR
TERMINALS	READING	TEMPERATURE STATUS			
+ and -	+5 VDC	Safe		Normal	
+ and -	0 VDC	Safe		Leads to Remote Shorted Circuit Malfunction	Remove Short Contact Jewett Service
+ and -	+5 VDC	High or Low		Circuit Malfunction	Contact Jewett Service
JG CIRCUIT					
TERMINALS	READING	TEMPERATURE STATUS	POWER		
1 CMN and NO	0 OHMS	SAFE	On	Normal	
2 CMN and NO	Infinite OHMS	Not Applicable	Off	Normal	
3 CMN and NO	Infinite OHMS	Safe	On	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service
4 CMN and NO	0 OHMS	Not Applicable	Off	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service
5 CMN and NC	Infinite OHMS	Safe	On	Normal	
6 CMN and NC	0 OHMS	Not Applicable	Off	Normal	
7 CMN and NC	0 OHMS	Safe	On	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service
8 CMN and NC	Infinite OHMS	Not Applicable	Off	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service
9 CMN and NO	Infinite OHMS	High or Low	On	Normal	
10 CMN and NO	0 OHMS	High or Low	On	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service
11 CMN and NC	0 OHMS	High or Low	On	Normal	
12 CMN and NC	Infinite OHMS	High or Low	On	Relay or Circuit Malfunction	Replace Relay Contact Jewett Service

T100-1

CALIBRATION PROCEDURE

1) ALLOW T100 TO OPERATE FOR A MINIMUM OF 30 MINUTES.

2) T100-1 INSERT 10° C. CALIBRATION PLUG ONTO END OF UPPER SOLUTION THERMISTOR CABLE.

3) DISCONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY. REMOVE FOUR SCREWS ON BACK OF COVER AND REMOVE COVER. RECONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY.

4) ADJUST R6 IF CALIBRATION IS REQUIRED (LOCATED IN THE LOWER LEFT HAND CORNER OF THE MAIN CONTROL BOARD AS SEEN LOOKING DOWN FROM THE TOP) FOR A READING OF 10.0° C. FOR T100-1

5) REMOVE CALIBRATION PLUG FROM UPPER SOLUTION THERMISTOR CABLE, AND RECONNECT THE UPPER THERMISTOR.

6) DISCONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY. REPLACE REAR COVER. CALIBRATION IS NOW COMPLETE. RECONNECT DOOR AJAR, 10VAC, REMOTE CONNECTIONS AND BATTERY.

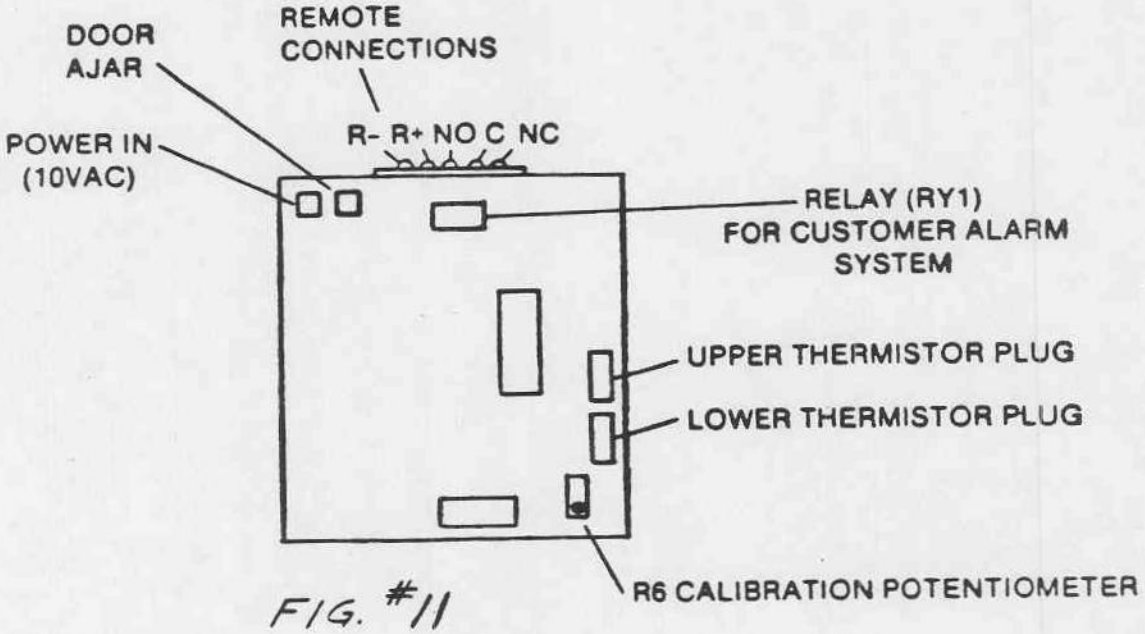

FIG. #11

REAR VIEW (COVER REMOVED)